

# Fact Sheet:

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April 1997

FL-57

## **RECYCLED PLASTIC LUMBER FOR MILITARY ENGINEERING APPLICATIONS**

### The Problem

The Army buys, uses, and disposes of millions of board feet of dimensional lumber annually. This lumber is used for the construction and operation of fixed training facilities on CONUS installations, the construction of base camp and field positions in CONUS and OCONUS field training exercises, and the construction of facilities for non-training, mission-oriented objectives. While natural wood has traditionally been used in large quantities for such construction applications, it is not always an ideal or cost-effective material for certain environments or certain operating conditions. Wood is highly susceptible to insect attack as well as to rot and swelling in high moisture conditions. It is highly absorbent and cannot be easily cleaned, disinfected, or decontaminated, thus limiting repeated use. The current practice of using dimensional lumber costs hundreds of thousands of dollars a year and depletes a natural resource.

### The Technology

Plastic lumber materials use waste plastic from the 6 billion pounds currently generated each year in the United States. These commingled waste plastic containers cannot be economically recovered and recycled as new containers. While recycled plastic lumber offers some advantages over wood (e.g., natural resistance to rot and insect attack), they have significantly different mechanical properties that must be considered in identifying appropriate uses.

Plastic lumber products are made in traditional dimensional lumber sizes. Besides being resistant to insects and rot, plastic lumber is nonabsorbent, and therefore, easily disinfected. Plastic lumber products meet Executive Order 12873 which requires Federal agencies to buy and use products that contain recycled/recovered waste materials. Plastic lumber products are themselves readily recyclable while dimensional wood materials are typically trashed and landfilled when damaged beyond reuse.

### Benefits/Savings

Plastic lumber has potential as an economical replacement for natural wood in many training and operational applications within the Army where wood has some inherent performance shortcomings. These applications include both fixed and field facilities. With its high recycled content and option for recycling, plastic lumber would have significant environmental advantages over the wood materials which are currently landfilled, often after a single use.

## Status

The U.S. Army Construction Engineering Research Laboratories (CERL) conducted research on these materials in a 3-year project under the Construction Productivity Advancement Research (CPAR) program. The U.S. Environmental Protection Agency (EPA) has also been providing support to CERL to continue efforts (initiated under the CPAR project) to develop test methods and performance standards for plastic lumber materials for introduction to the American Society of Testing and Materials. The CPAR project also established a beneficial working relationship with the plastic lumber industry through the Plastic Lumber Trade Association.

This research will leverage the CPAR project results with follow-on work to identify the limitations and performance unknowns of this material in military applications. Long-term durability and other mechanical property characterizations need to be better understood before widespread adoption of this technology by the field Army engineering community. Stiffness, creep and fastening properties are some high priority issues that need to be addressed. The efficiencies of these materials, e.g., cost comparisons, weight, logistical considerations, and constructability issues need also be evaluated relative to the Army's use as an alternative to wood. To begin assessing potential field applications of these plastic lumber materials, a pedestrian bridge is being designed for installation on a running trail at Fort Bragg, NC. Construction of this demonstration project is expected to be completed by October 1997. In another demonstration project with the National Park Service, an observation deck is being designed for possible installation at Great Falls National Park, VA.

## Point of Contact

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*Last Modified: May 28, 1997  
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